



U.S. Department
of Transportation
**Federal Aviation
Administration**

Advisory Circular

Subject:

**THE CONTINUED AIRWORTHINESS
OF OLDER AIRPLANES**

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Change:

1. PURPOSE. This advisory circular (AC) provides information and **recommendations** to manufacturers and airplane **owners/operators** for the **development** and use of programs to assure the continued airworthiness of older airplanes not covered under AC 91-56, **Supplemental Structural Inspection Program for Large Transport Category Airplanes**.

2. Background. Airplanes are designed and built to provide **many** years of service. For the airplane to **remain** airworthy and safe to **operate** for a long inservice life, it should be operated in accordance with the **recommendations** of the manufacturer and cared for with sound inspection and **maintenance practices**.

a. Service experience has revealed that an aging **airplane** needs **more** care and special attention during the maintenance processes and, at **times**, requires more frequent inspection of structural components for damage due to **environmental** deterioration, accidental **damage**, and fatigue. **Typical** areas requiring **more** frequent inspection, and key to continuing the useful life of an airplane are structural points such as:

(1) Wing spar capstrips, with particular attention to the spar lower capstrips.

(2) Wing attach points, both on the wing and on the fuselage.

(3) Wing fuselage carry-through structure.

(4) Wing upper and lower covers between spars.

(5) Pressurized structures, especially around doors, windows, windshields and other cutouts **on** pressurized airplanes.

(6) Horizontal tail spars and spar capstrips.

(7) Horizontal tail spar **attachments** and fuselage **attachments**.

(8) Horizontal tail fuselage carry-through structure.

(9) **Vertical** tail spars and spar capstrips.

(10) **Vertical** tail spar attachments and fuselage **attachments**.

- (11) Lifting **surfaces.**
 - (12) Control surfaces **and their respective hinge points.**
 - (13) Control surface **balance weight attachments.**
 - (14) Control system **attach points at the various control surfaces.**
 - (15) Tab hinges.
 - (16) Tab actuators.
 - (17) **Main landing gear attach points where landing gear loads feed into primary wing and/or fuselage structure.**
 - (18) Structure and flooring especially in the vicinity **of lavatory and galley areas and areas of overboard drains and vents.**
 - (19) Structural and flooring area **attachments in cabin and cockpit and at seat and equipment attachments.**
- b. In addition to the key items outlined above which are important to safety **of** flight, there are other areas that should receive special attention. Typical **areas are:**
- (1) Engine **mounts.**
 - (2) Propeller blades.
 - (3) Door latching **mechanisms** on pressurized airplanes.
 - (4) Windshields and windows on pressurized **airplanes.**
 - (5) Landing gear **shimmy dampers.**
 - (6) Main and nose gear supporting structure.
 - (7) Cowling, **fairing,** and fillet **attachments** and supporting structure
 - (8) Materials used in aircraft **compartment interiors (including finishes or decorative surfaces applied to the materials) to assure they have not deteriorated due to aging, cleaning or other causes that would increase their flammability over what it was when they were new.**

3. **CONTINUED AIRWORTHINESS.** To provide for a safe operation, a program called **"continued airworthiness"** should be developed by the manufacturer and used by **owners/operators where virtually every component comprising an airplane is involved in some form of preservation, inspection, maintenance, preventive maintenance, overhaul, repair, and/or replacement activity.**

a. Safety of ~~operation~~ through continued airworthiness demands increasing vigilance as an airplane ages. Airplane structural materials do have finite lives, and the extent of these is affected by ~~age~~, operational ~~environment~~, and operational ~~experience~~ which the material endures in day-to-day usage of the airplane.

b. ~~Maintenance~~ information ~~needs to be~~ continually updated. ~~Open communi-~~cation should exist with the ~~owner/operator~~ advising the ~~manufacturer~~ as soon as a new situation arises, and the manufacturer responding with solid help. Such ~~communication~~ and cooperation will facilitate the ~~maintenance~~ of an entire fleet of airplanes in a ~~continuously~~ airworthy ~~condition~~.

4. MANUFACTURERS' PARTICIPATION. The framework for ~~continued~~ airworthiness of airplanes is dependent upon the care and thought designed into the airplane at its inception and reflected in the type design. Following type ~~certification~~, the establishment of, and adherence to, thorough maintenance procedures is required. Thus the ~~manufacturer~~ should prepare and distribute ~~recommendations~~ on the ~~need~~ for increased inspection vigilance for those older (geriatric) airplanes which may not have a well-defined program for ~~continued~~ airworthiness, and which include areas of special consideration as are listed in paragraph 2(a) and (b) of this AC. This information should ~~be~~ available in clear, concise language to those who need it. ~~Sometimes~~, especially for ~~complex~~ airplanes, it may ~~be necessary~~ to provide specific training in the proper ~~maintenance~~ of the airplane and its ~~systems~~. These activities should ~~be~~ developed by the manufacturer based upon its familiarity with the design and function of the airplanes.

5. IMPLEMENTATION BY OWNERS/OPERATORS. Vigilance is the price of safety and, ~~even~~ though the manufacturers have done their best to anticipate all the maintenance required to provide for continued airworthiness, aging airplanes demand ever increasing care. Because of this the final care rests primarily with the owner/operator who should:

a. Follow the manufacturer's ~~recommended~~ maintenance and inspection ~~procedures~~.

b. Recognize that ~~corrosion~~ or damage to structure can drastically shorten fatigue life and ~~be~~ on the lookout for these conditions.

c. ~~Be~~ alert to the possibility that the airplane is not being used in a manner significantly different ~~from~~ the originally intended mission profile. ~~Low~~ altitude operation, such as pipeline patrol, sightseeing, or training ~~operations~~, will subject the airplanes to ~~more~~ fatigue ~~damage~~ than high altitude cruise.

d. ~~Comply~~ with applicable Airworthiness Directives, and review possible modifications available ~~from~~ the ~~manufacturer~~. Structural ~~improvements~~ are usually directed to lowering working stresses, and the sooner they are made, the better they are to slow the onset of ~~cumulative~~ damage to the original ~~structure~~.

e. ~~Become~~ interested in the fatigue program on prospective ~~new airplanes,~~ including a clear understanding of the Elated inspection program ~~recommended~~ by the manufacturer, and make ~~certain~~ all significant areas of the ~~airplane's~~ structure are treated in the airplane's inspection program.


Joseph A. Pontecorvo
Acting Director of Airworthiness

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